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mixture thereof.

24. A composite membrane as in Claim 21 wherein said organic sulfonic acid  
2 compound further contains a C<sub>1</sub>-C<sub>8</sub> carboxylic acid, hydroxy, alkoxy or halo  
functional group or a combination thereof.

25. A composite membrane as in Claim 15 wherein said solution of an organic  
2 sulfonic acid compound comprises said organic sulfonic acid compound dispersed  
or dissolved in water, alcohol, glycol, alkoxy alcohol or a carboxylic acid or a mixture  
4 thereof.

26. A composite membrane as in Claim 15 wherein said low pressure membrane  
2 has a sodium chloride rejection of at least about 80 percent and a flux of at least  
about 5 gfd when tested on 0.05 percent aqueous sodium chloride at 150 psi and  
4 25°C.

#### REMARKS

In the subject Office Action the Examiner objected to the claim numbering, noting that there was no claim numbered "14" and that the claim numbering skipped from Claim 13 to Claim 15. As discussed during telephone interviews between Applicant's undersigned attorney and the Examiner on June 3 and 6, 2002, the numbering gap was an inadvertent typographical error. The elected claims have been correctly renumbered herein as Claims 15-26 respectively. Original "Claim 15" was in fact the 14th claim, and has been renumbered as "Claim 14" by the Examiner. As such it has been cancelled herein as being directed to non-elected subject matter, as discussed below.

In the subject Office Action the Examiner confirmed his previous restriction requirement (made during the telephone interviews), requiring election by Application between Claims 1-14 (Group I) and Claims 15-26 (Group II). Applicant hereby confirms the election for prosecution of Claims 15-26 (Group II) as previously made during the

telephone interviews by Applicant's attorney. Claims 1-14 (Group I) have been cancelled herein as directed to a non-elected invention. Applicant does, however, reserve the right to file a divisional application directed to the subject matter of Claims 1-14 as provided by 35 U.S.C. § 121.

Applicant notes the discussion during the telephone interviews of the status of Claims 13 and 14, which are product-by-process membrane claims. The Examiner has determined that these belong in Group I with the process claims from which they depend, rather than being included with the other membrane claims of Group II.

Applicant has herein amended three of the paragraphs of the Specification to correct minor typographical errors. No new matter has been introduced.

The Examiner has rejected Claims 15-26 under 35 U.S.C. § 103(a) over the combination of Cadotte et al. (USP 4,765,897) in view of Koo et al. Applicant respectfully submits that the amendments and remarks herein avoid and/or traverse the Examiner's rejection.

Cadotte et al. define a membrane which is formed by a process including a step of contacting the membrane after formation with a "strong mineral acid." Cadotte specifically confirms the common chemical understanding that a "mineral" acid is an inorganic acid (col. 1, lines 52-55; col. 3, line 65 to col. 4, line 31). In that same text, Cadotte et al. define various phosphorus acids and sulfuric acid as the mineral acids of preference. The acid treating step of Cadotte et al. is then followed by further contact of the acid-treated material with a "rejection enhancing agent" (col. 1, lines 63-68) which can be any of certain defined polymers or colloids, one of which is tannic acid (col. 5, line 31 to col. 6, line 51, esp. col. 4, line 43).

Both steps are necessary in Cadotte et al's process or a suitable functioning membrane cannot be produced on any kind of consistent basis. As Cadotte et al. have noted (col. 1, lines 43-45) an effective membrane must have a magnesium sulfate rejection rate of at least 85%. Cadotte et al's own data (Table III) shows that without the final step of treating with a tannic acid rejection enhancing agent, none of the phosphoric acid-

treated membranes reached the minimum 85%  $\text{MgSO}_4$  rejection. Consequently Cadotte et al. necessarily teach that a rejection enhancing agent treating step is critical.

The Examiner cites Koo et al. as teaching reaction of an organic sulfonic acid with a polyfunctional amine in the polyamine aqueous solution from which the membrane is formed. He then contends that from Koo et al. it would be obvious to one of ordinary skill in the art to replace the mineral acid used by Cadotte et al. with the organic sulfonic acid, and on that basis rejects Applicant's claims. Applicant respectfully traverses the Examiner's rejection, for several reasons.

First, it is well settled that In order for a chemical from one reference to be substituted for another chemical in another reference, there must be a teaching of such substitution in one or the other reference, or from general chemical knowledge. Mineral acids and organic sulfonic acids are well known to have substantially different chemistries in many regards. Examination of standard general chemistry and organic chemistry texts will show that mineral acids and organic sulfonic acids are routinely treated as entirely different chemical classes, so the teaching on which the Examiner's combination relies cannot come from the chemistry generally. Neither does it come from the cited references, since neither Cadotte et al. nor Koo et al. contains any such suggestion. Consequently no one skilled in the art would consider substituting any of Koo et al's organic sulfonic acids for mineral acids in Cadotte et al's membrane process. Therefore the combination of Cadotte et al. with Koo et al. does not make Applicant's claims obvious under § 103(a).

Second, Koo et al. place their organic sulfonic acid directly into the aqueous solution from which the membrane is produced. In that solution the sulfonic acid undergoes reaction to a "salt-containing product" (col. 5, lines 20-24) and loses its identity as a sulfonic acid. The neutral salt also remains in the aqueous phase, and does not migrate into the solvent phase in which the membrane is formed. The function of the salt is not clear from Koo et al.; the patentees merely speculate that the salt may have some pore forming function (col. 5, lines 37-43). However, as to treating an already-formed membrane with an acid of any type, mineral or organic, Koo et al. teaches nothing, *since*

*no acid is present for treating because all have previously been converted to neutral salts in the Koo et al. system.* Koo et al's chemistry requires removal of the organic sulfonic acid *prior to membrane formation* by reaction to a neutral salt -- Cadotte et al's chemistry requires contacting of the membrane *after formation* with the mineral acid. One skilled in the art would therefore not contemplate combining Cadotte et al. and Koo et al. since they are non-analogous. For this reason also the combination of Cadotte et al. and Koo et al. cannot support the § 103(a) rejection of Applicant's claims.

In this regard Applicant submits that no amendment of the claims with respect to the sulfonic acid treating to distinguish the prior art is necessary, since neither Cadotte et al. nor Koo et al. teach anything appropriately relevant to contacting the top layer of a membrane with a sulfonic acid to yield a superior membrane.

Third, even if one were to try the substitution argued by the Examiner, and treated Cadotte et al's polyamide membrane with one of Koo et al's organic sulfonic acids, there would still be no teaching of Applicant's invention within the meaning of § 103(a). As discussed above, Cadotte et al. teaches that in order to make a membrane having an acceptable minimum  $\text{MgSO}_4$  rejection rate of at least 85%, it is critical to follow the acid treating with subsequent treating with the rejection enhancing agent. *Nothing in either Cadotte et al. or Koo et al. changes that teaching in any way.* The prior art thus teaches that even if one did make the substitution contended by the Examiner, *the subsequent rejection enhancing agent treatment would still be required to make a functional membrane.*

Applicant has invented a superior, highly effective and functional membrane which is treated with an organic sulfonic acid. Applicant's product has been shown to be substantially superior to the very product defined by Cadotte et al, including Cadotte et al's enhancement step; see ¶¶ 0034-0035 and Table 7 in Applicant's Specification. Since neither Cadotte et al. nor Koo et al. suggest any such combination or teach the unexpected and superior results obtained by Applicant, the Examiner's assertion of such combination can be derived only by hindsight from Applicant's disclosure, which of course is

impermissible under §103(a).

For the above reasons, Applicant submits that his invention as claimed in Claims 15-26 is not and cannot be obvious under § 103(a) from the combination of Cadotte et al. with Koo et al., and therefore respectfully requests that the Examiner reconsider and withdraw the rejection.

### **FEES**

It is not believed that any fees are due with respect to the amendment of the claims herein. However, should any such fees be due, the Patent and Trademark Office is authorized to charge all such fees to Deposit Account No. 02-4070.

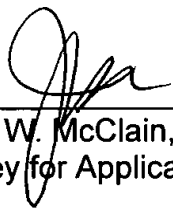
### **CONCLUSION**

In view of the above amendments and remarks, it is respectfully submitted that all grounds of rejection and objection have been avoided and/or traversed. The Examiner is therefore respectfully requested to enter the amendments herein, reconsider and withdraw the rejections and objections and allow Claims 15-26, as amended, all claims in the case following amendment and compliance with the restriction requirement.

Should the Examiner believe that prosecution of this application might be expedited by further discussion of the issues, a telephone call to the undersigned attorney, collect, at the telephone number listed below, is cordially invited.

Respectfully submitted,

Date: August 16, 2002

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